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## (54) APPARATUS FOR VAPOURISING LIQUID FUELS


(71) We, TUNG-CHU TSUEI, a Chinese citizen, of No. 4-1, Alley 5, Lane 77, Ching Jen Street, Ching Mei District, Taipei, Taiwan, Republic of China, KUN-MING LIU, a Chinese citizen, of No. 52, Lane 63, Lung Kang Road, Section 1, Chung Li, Taiwan, Republic of China, MING-KONG CHEN, a citizen of Hongkong, of Sau Mau Ping 30 Block Flat 1340, 13 Floor, Kowloon, Hong Kong, and PETER YOUNG SOO HAN, a Korean citizen, of 9/D Taichi Court, 134 Austin Road, Kowloon, Hong Kong, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—


This invention relates to apparatus for vapourising liquid fuels, in particular fuels for cooking purposes.

Fuel used in gas cookers such as town gas, natural gas and LPG (liquefied petroleum gas) has good ignition characteristics and provides complete combustion. On the other hand it can cause suffocation or toxic effects and has an explosive inflammability. However liquid fuel gives rise to ignition problems due to its high flash point and also may be subject to incomplete combustion due to its incomplete vapourisation, thus causing poor efficiency and air pollution.

According to the present invention apparatus for vapourising a liquid fuel comprises a sliding vane type rotary air compressor having a rotor and an alternating current electric motor connected to rotate the rotor, and a connector assembly for connection to a container for the liquid fuel and having an inlet pipe connected to a compressed air outlet passageway of the air compressor for introducing the compressed air into the container, an outlet pipe permitting the vapourised liquid fuel to leave the container, and a pressure detector responsive to the pressure within the container to control the motor, the detector including a bellows spring biased against the pressure, an electric switch controlling the energisation of the motor, and a rod coupling movement of the bellows to the switch, whereby the pressure detector switches the motor to maintain the pressure in the container substantially constant.

Provision of this apparatus thus enables a liquid fuel to be readily converted into a gaseous state for example for cooking purposes.

By way of example apparatus in accordance with the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a vertical section through a sliding vane type rotar air compressor in the apparatus;

Figure 2 is a cross-section along the line II—II in Figure 1; and

Figure 3 is a vertical section through the connector assembly in the apparatus.

Reference should be made first to Figure 1 which shows the air compressor. This is of small size and has an A.C. electric motor M having an output shaft 12 mounted in oilless bearings 13 providing smooth running. The motor speed can be adjusted up to 3600 revolutions per minute by a speed adjustment control 14.

The shaft 12 projects upwardly from the motor proper and carries a rotor 11 which, as is shown in Figure 2, is secured to the shaft 12 by a threaded pin or bolt 15. The rotor 11 has two diametrically opposed sliding vanes 16 located in respective slots 17. As can be seen the vanes cooperate with the circular wall of the chamber 19 in which the rotor 11 is located, the chamber axis being offset from that of the shaft axis. Two parallel passageways 18 and 20 extend into the same side of the chamber 19. The passageway 18 serves to admit air into the chamber, where the air is then compressed by the rotation of the rotor 12 in an anticlockwise direction as indicated by the arrows, after which the compressed air leaves the chamber through the passageway 20.

The connector assembly is shown in Figure 3, which also shows a liquid fuel container 2 containing fuel F and in the mouth of which the assembly is connected in a pressure-tight


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manner. The container 2 should be capable of withstanding an internal pressure of at least 0.5 kg/cm² and is preferably of cast iron or steel. The connector assembly includes an inlet pipe 31 connected to the outlet passageway 20 of the air compressor and an outlet pipe 32 to which the cooker or other gas appliance is connected.

The connector assembly also includes a pressure detector 3 which is connected to detect the gas pressure in the outlet pipe 32 and hence that in the container 2. This pressure acts upwardly against a rubber bellows 33 which is biassed downwardly by a coil spring 34. Thus pressure increases cause the bellows 33 to rise and decreases cause the bellows to fall. This movement is transmitted by a vertical rod 35 to an electric switch 36 which controls the energisation of the electric motor M in the air compressor.

In operation the compressed air produced by the air compressor passes into the liquid gas container 2 through the passageway 31. The fuel F is thus vapourised by the heat content of the compressed air. The vapourised fuel passes out of the container along the passageway 32. As the pressure in the container comes up to a pre-set level, the bellows 33 moves upward and causes the rod 35 to open the electric switch 36, thus de-energizing the motor M. As the pressure in the container falls, the consequent downward movement of the bellows 33 and rod 38 closes the electric switch 36 thus restarting the motor M to increase the pressure. Thus the pressure in the container 2 is maintained at a preset average value determined by the spring 34, preferably 0.48 kg/cm².

## WHAT WE CLAIM IS:—

1. Apparatus for vapourising a liquid fuel, comprising a sliding vane type rotary air compressor having a rotor and an alternating current electric motor connected to rotate the rotor, and a connector assembly for connection to a container for the liquid fuel and having an inlet pipe connected to a compressed air outlet passageway of the air compressor for introducing the compressed air into the container, an outlet pipe permitting the vapourised liquid fuel to leave the container, and a pressure detector responsive to the pressure within the container to control the motor, the detector including a bellows spring biased against the pressure, an electric switch controlling the energisation of the motor, and a rod coupling movement of the bellows to the switch, whereby the pressure detector switches the motor to maintain the pressure in the container substantially constant.

2. Apparatus according to claim 1 in which the rotor is located in a chamber from the same side of which two substantially parallel passageways extend one of which serves to introduce air into the chamber and the other of which forms said outlet passageway.

3. Apparatus according to claim 1 or 2 in which the motor has a speed adjustment control permitting adjustment of the rotor speed up to 3600 revolutions per minute.

4. Apparatus for vapourising a liquid fuel, substantially as herein described with reference to and as illustrated in the accompanying drawings.

5. Apparatus according to any one of the preceding claims in combination with a liquid fuel container and to which the connector assembly is connected.

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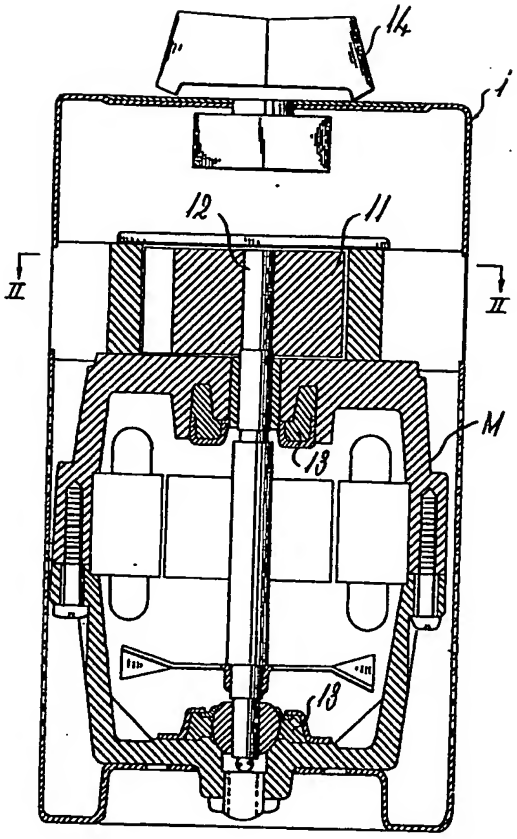
Sheet 1

FIG. 1



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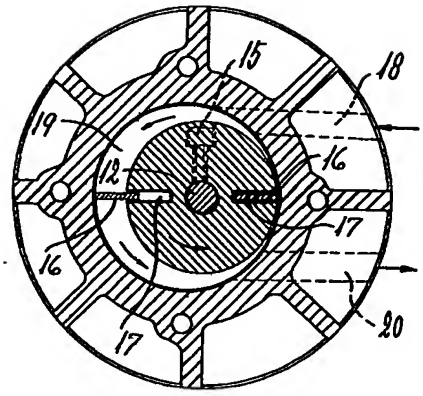
Sheet 2

FIG. 2



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**Sheet 3**

FIG. 3